ALGORITHMS TO CONSTRUCT VORONOI DIAGRAMS AND DELAUNAY TRIANGLES

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ABSTRACT

The Voronoi grid is considered to be the dual of the Delaunay triangles formed for a given set of nodes in a plane. For a given set of nodes, Delaunay triangles are constructed by connecting the nodes in close proximity into triangles, such that the circumscribed circle of a triangle will not include the nodes of the adjacent triangles. The Voronoi grid is formed by the perpendicular-bisectors of the edges of the Delaunay triangles, such that the closest bisectors clip each other.

The first phase of the study was to find the background information and existing literature on the subject. After becoming familiar with the concepts, the construction methods were studied. The literature found on the subject showed three common algorithms to construct the Voronoi diagrams, namely the Byer's algorithm and the Fortune's algorithm. These approaches were studied in depth and converted to computer models. In addition, one of the 'home-grown' algorithms was developed based on the 'closest-neighbor' principle.

Currently a Windows application is being developed using MS-Foundation Classes to implement the algorithms. The efficiencies of the algorithms will be compared as the final outcome.